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(54) Abstract Title: **Selecting functions via a graphical user interface**

(57) A graphical user interface (GUI) allows function commands to be selected, such as function commands applied to image data. A first user-generated input command, such as the pressing of a spacebar on a keyboard, displays a plurality of function gates (701) at a cursor position (602). Movement of a stylus or similar device through one of said displayed gates (702, 703, 704, 705) results in a related menu being displayed from which a specific function may be selected.

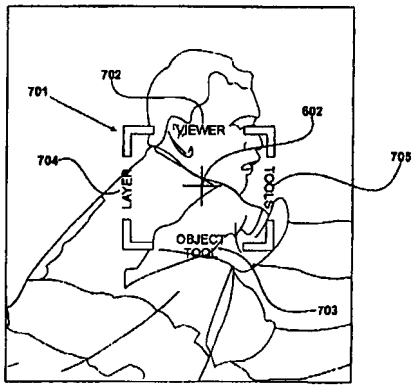


Figure 7

GB 2 391 148 A

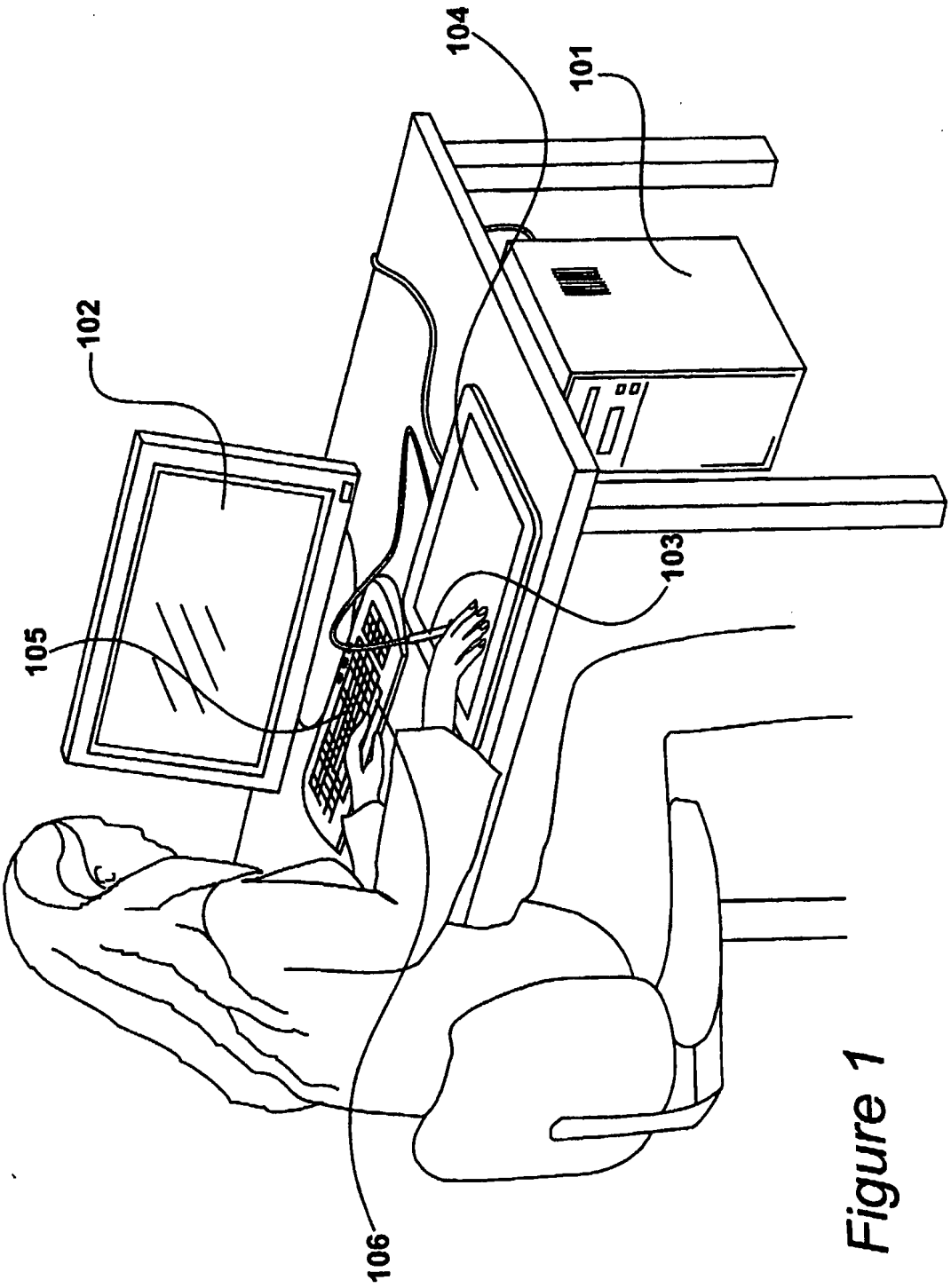


Figure 1

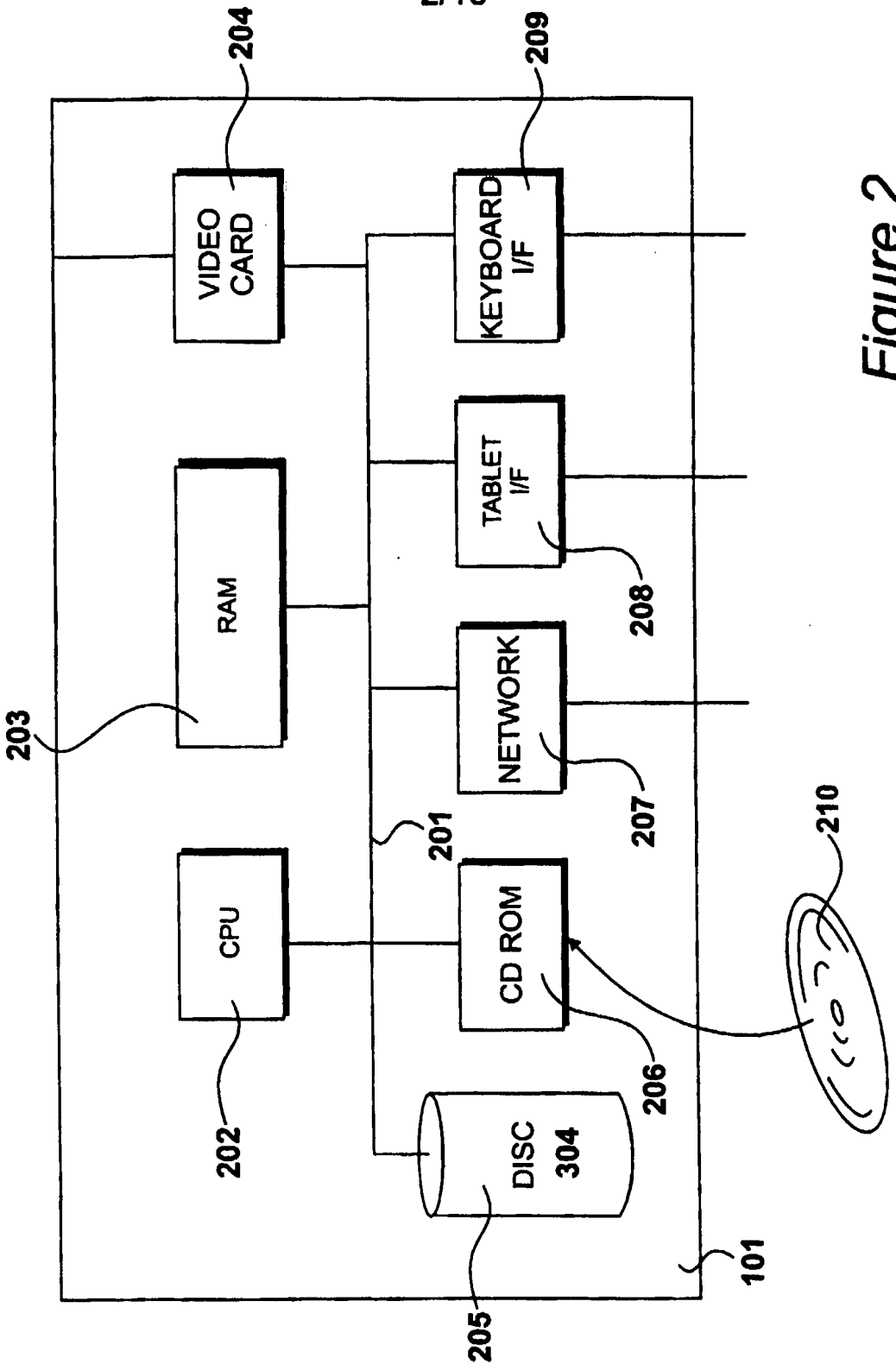
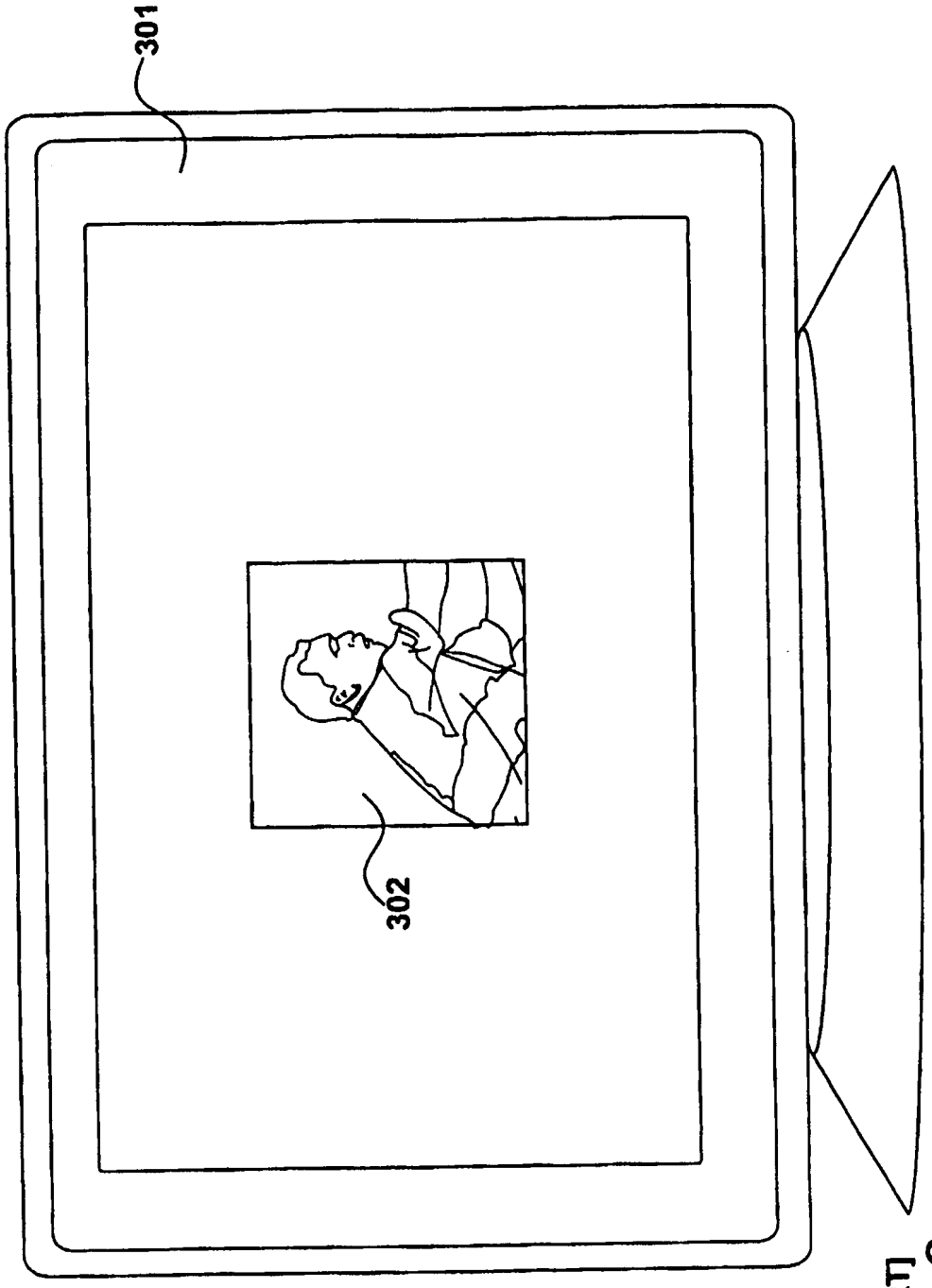
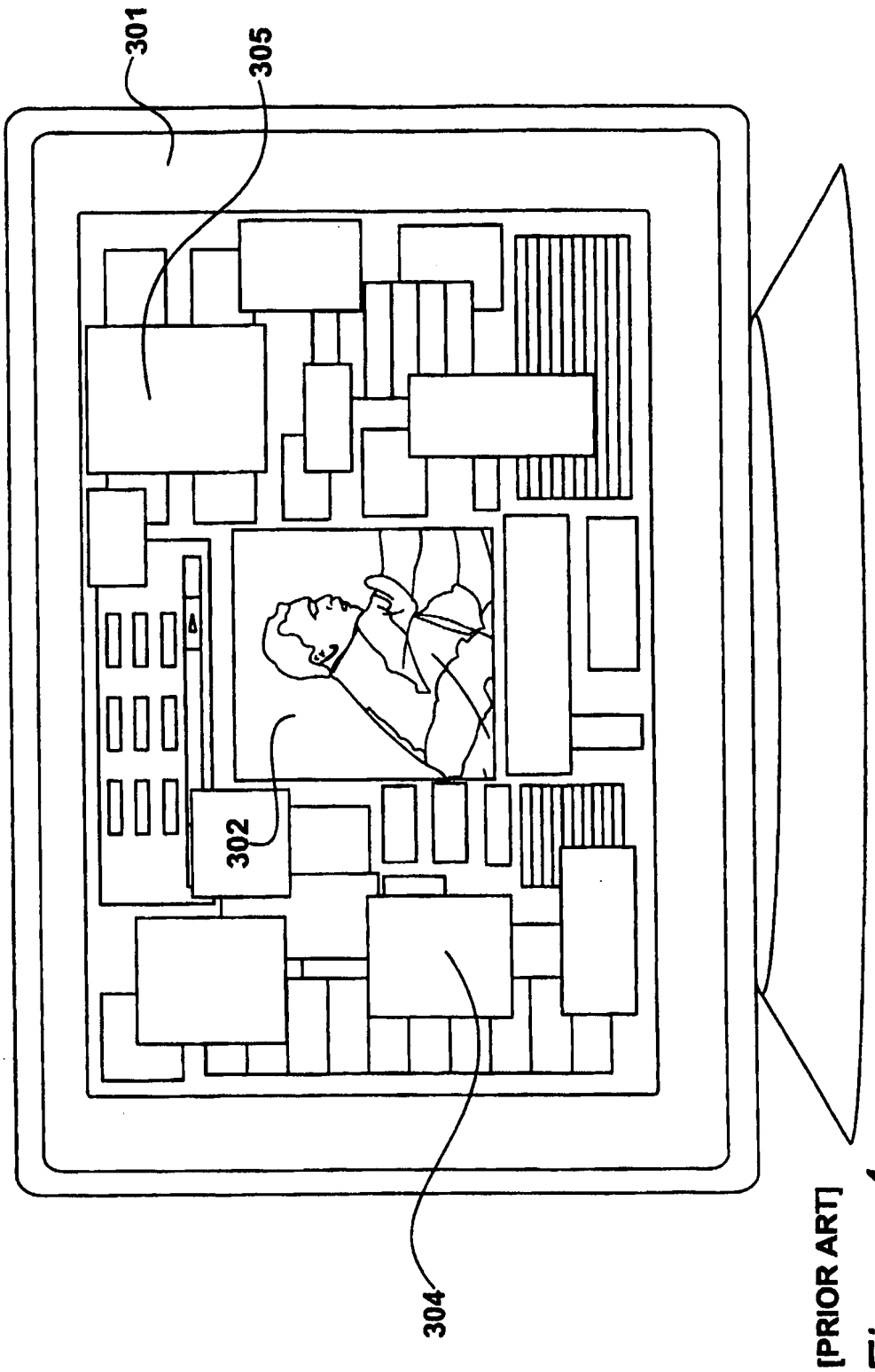

204
209
VIDEO CARD
KEYBOARD I/F
TABLET I/F
208
RAM
203
NETWORK
207
201
210
CPU
CD ROM
206
202
DISC 304
101
205

Figure 2



[PRIOR ART]
Figure 3



[PRIOR ART]

Figure 4

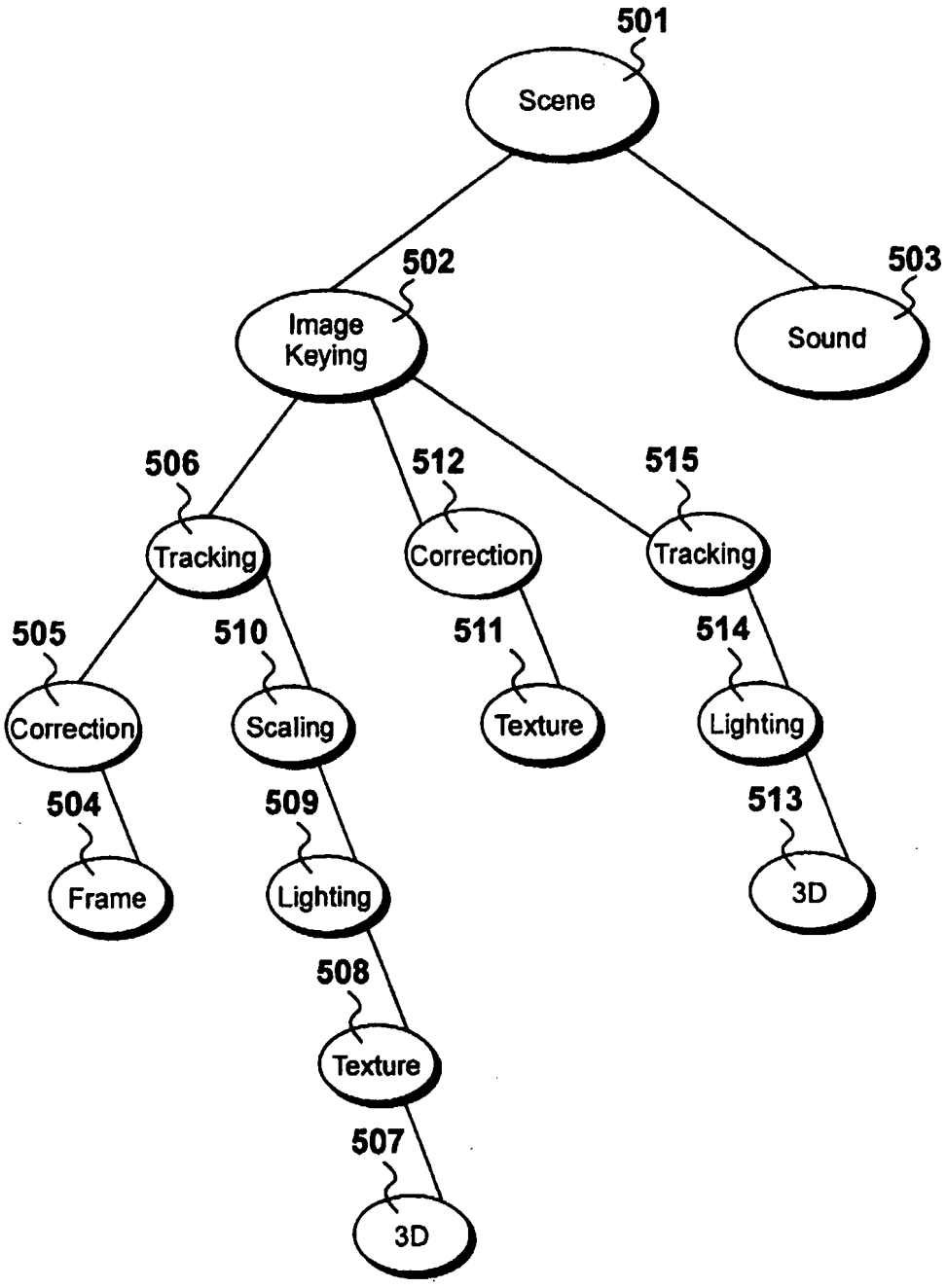

501
Scene
502
Image Keying
503
Sound
506
Tracking
512
Correction
515
Tracking
505
Correction
510
Scaling
511
Texture
514
Lighting
504
Frame
509
Lighting
513
3D
508
Texture
507
3D

Figure 5

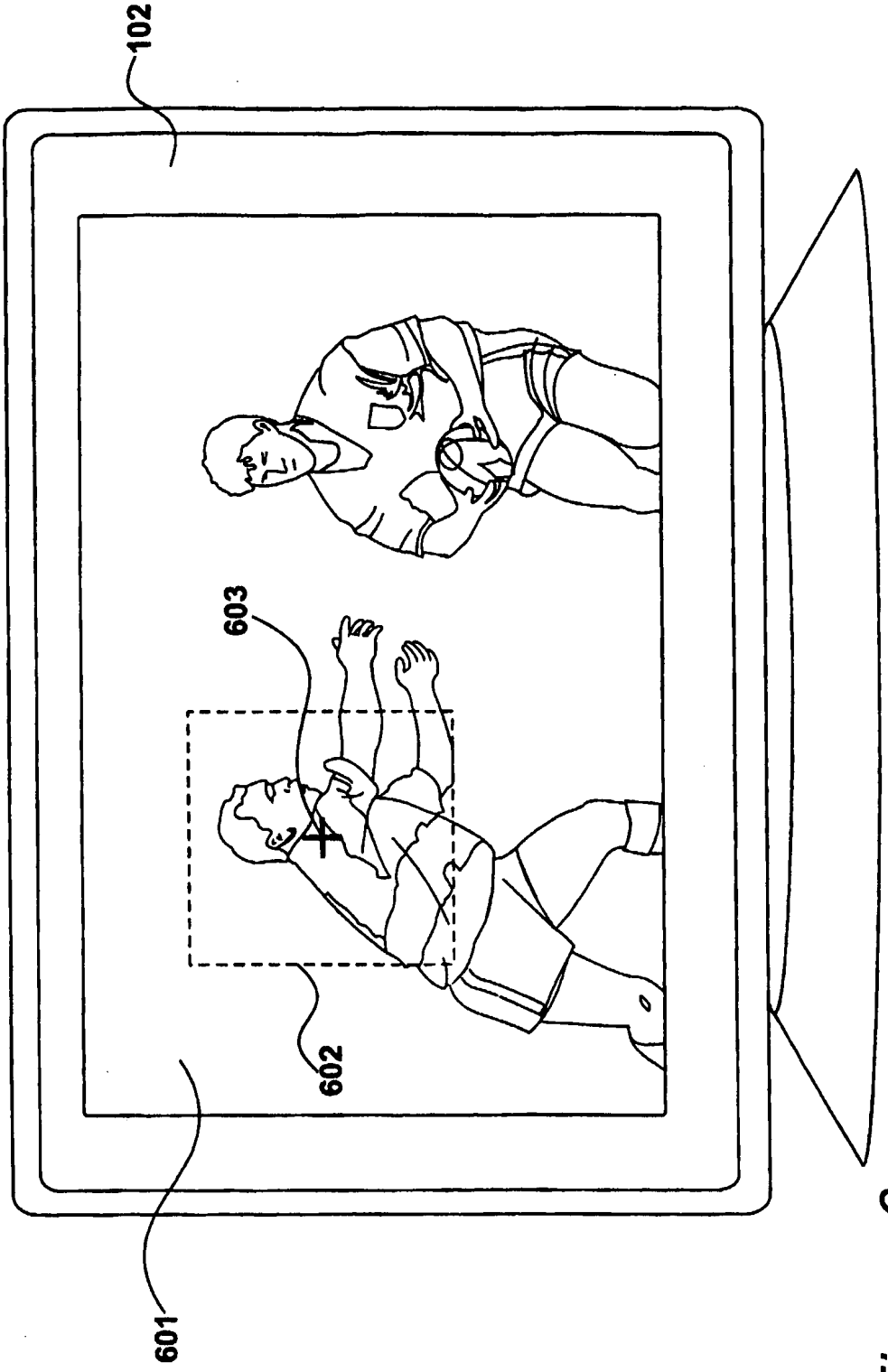


Figure 6

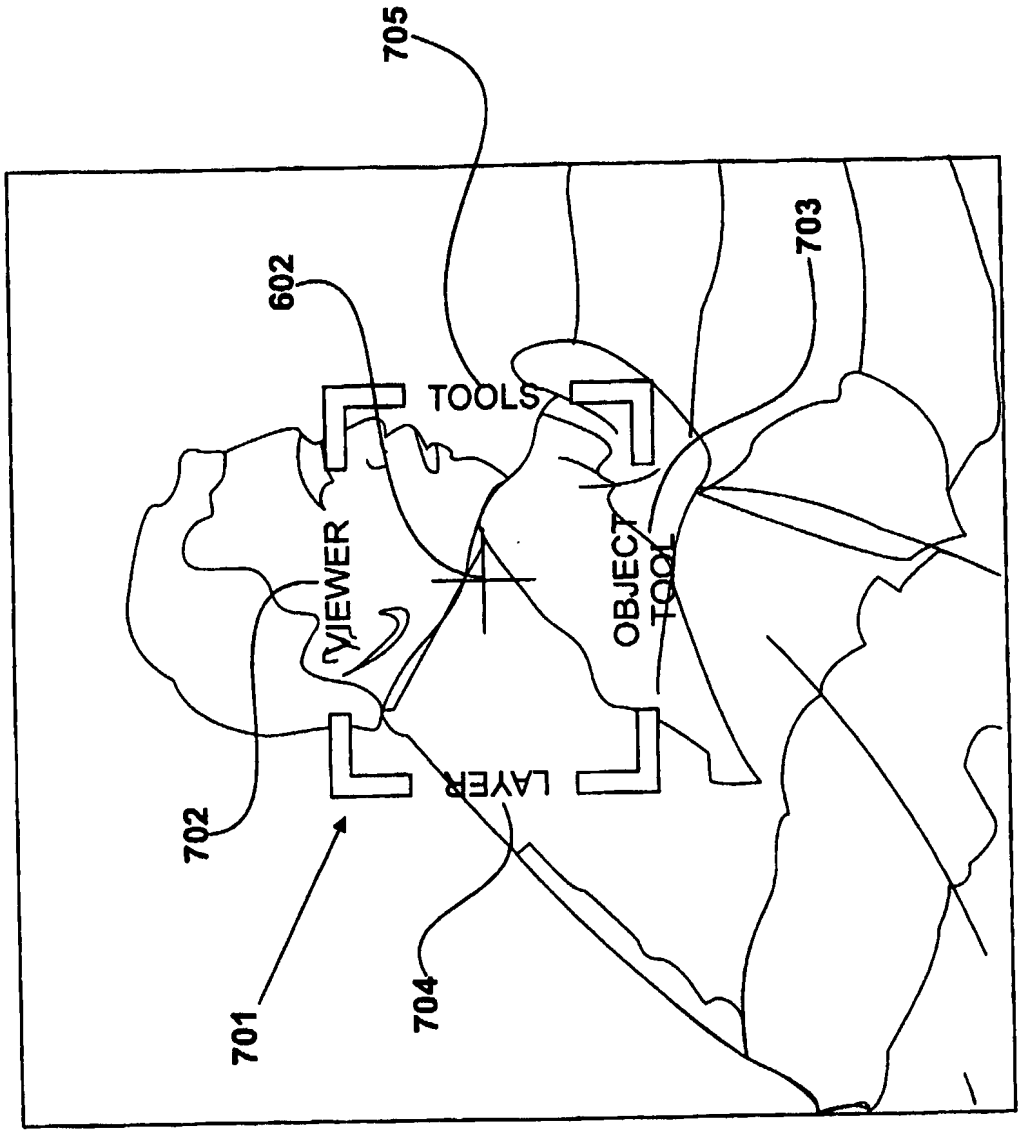


Figure 7

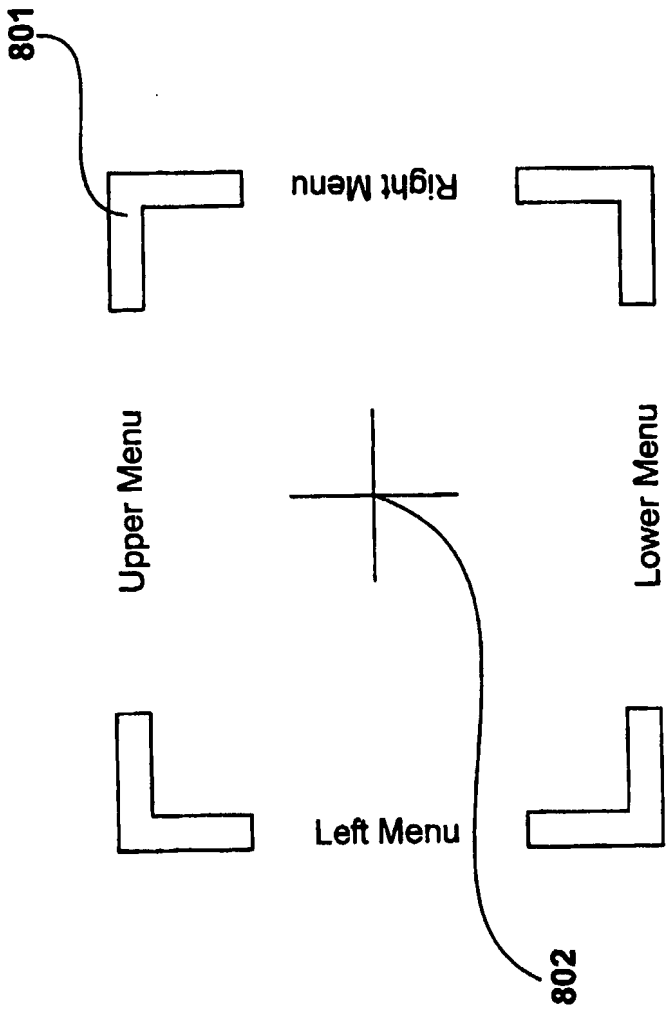


Figure 8

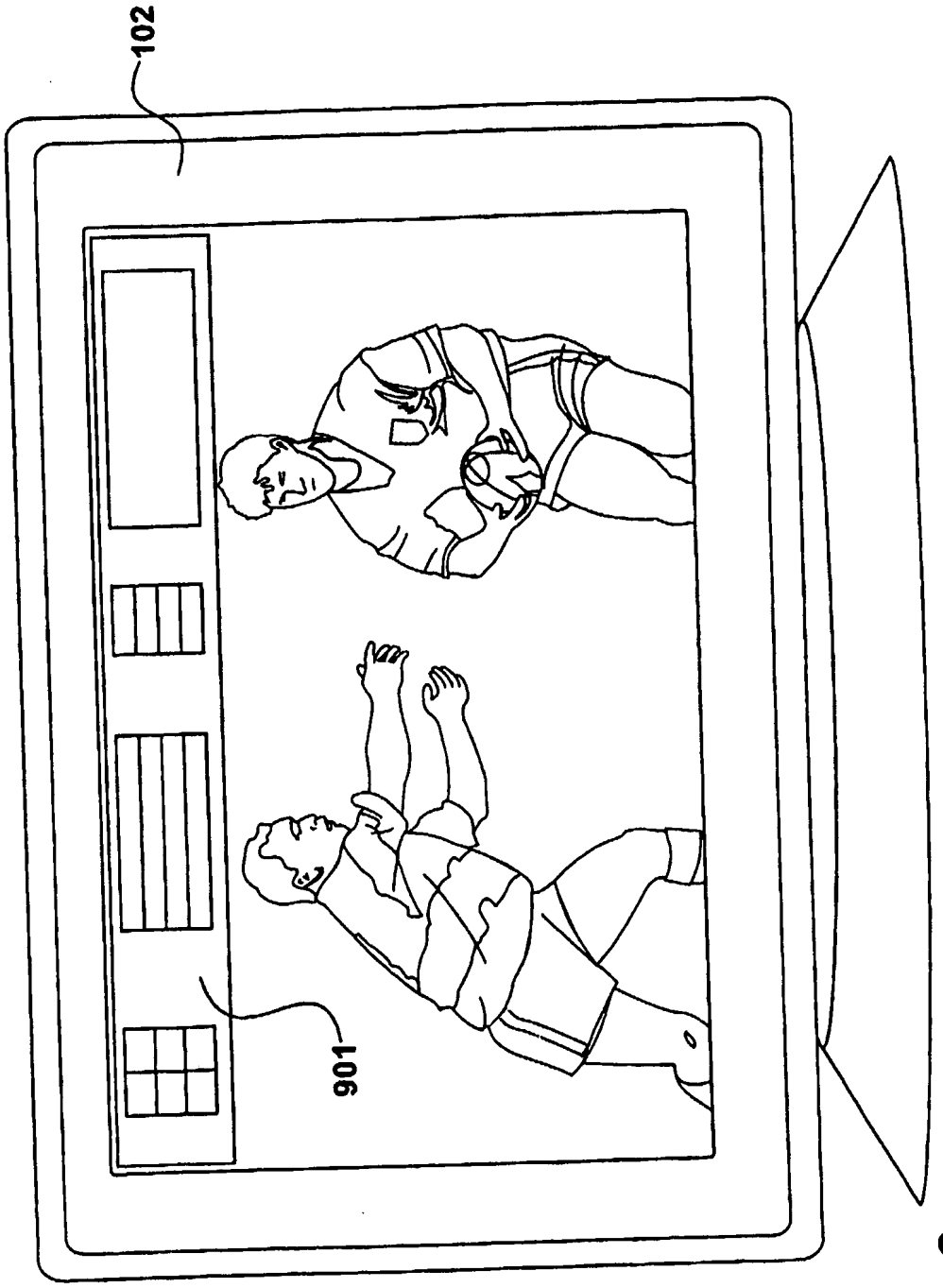


Figure 9

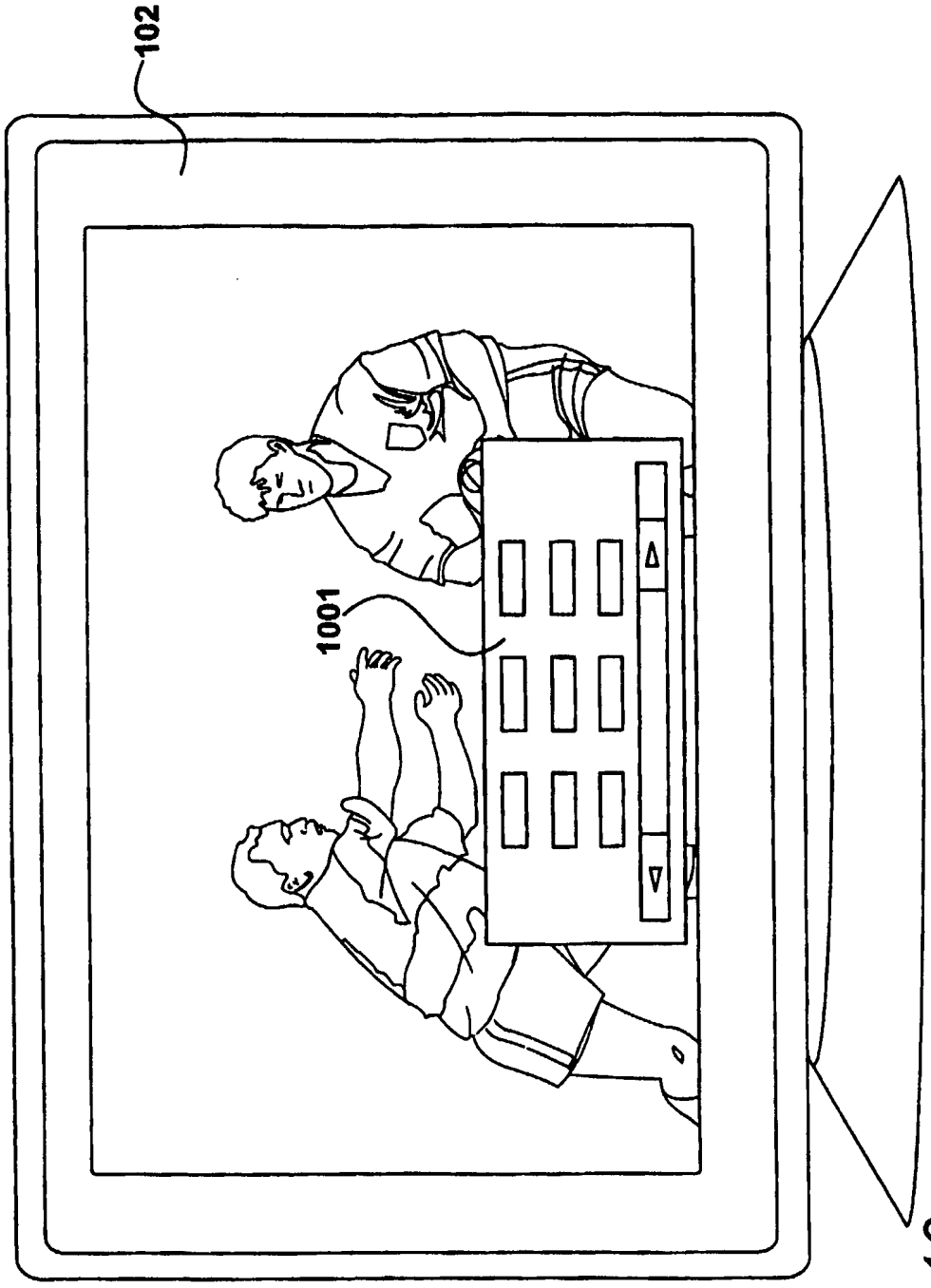


Figure 10

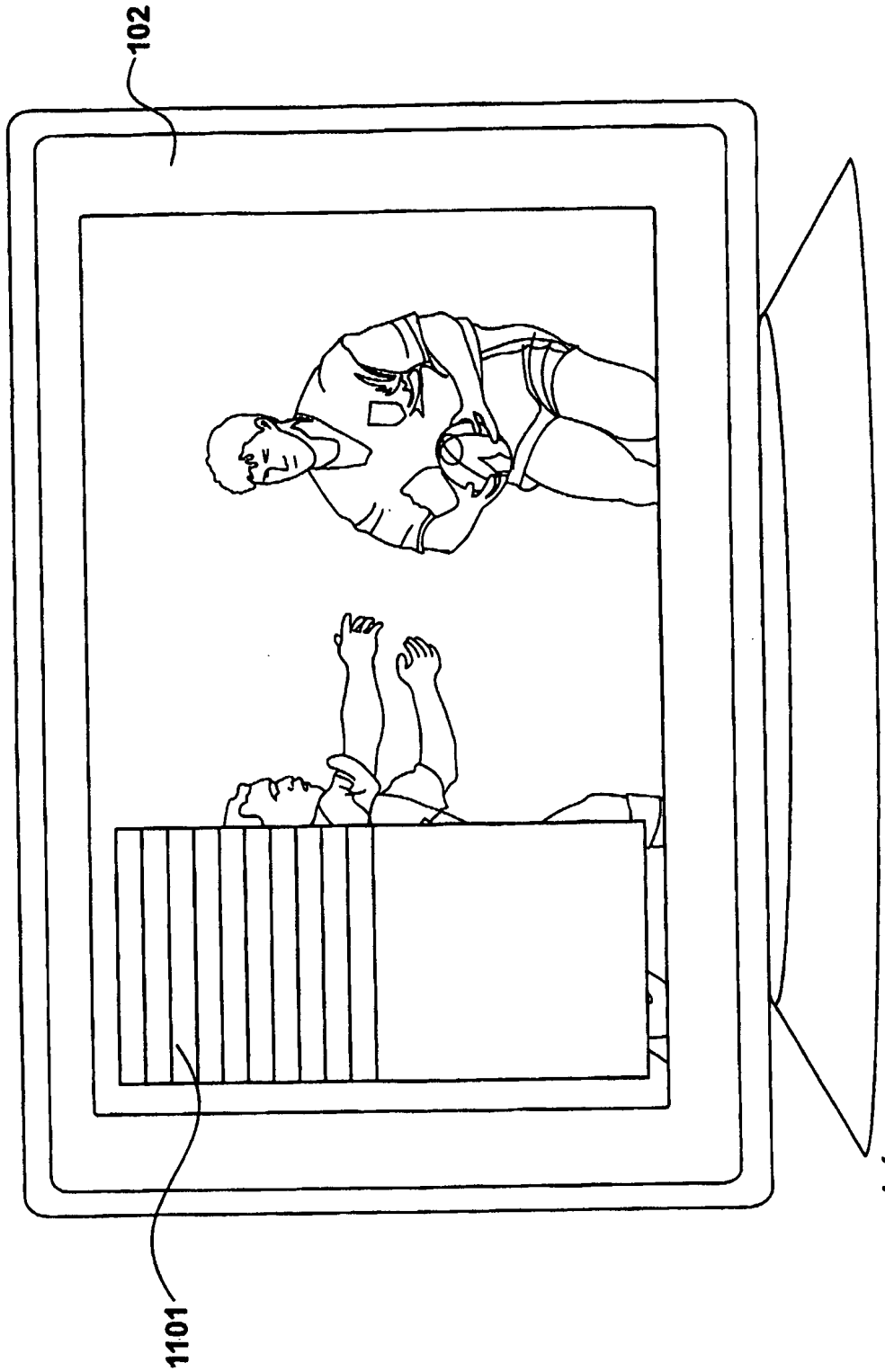


Figure 11

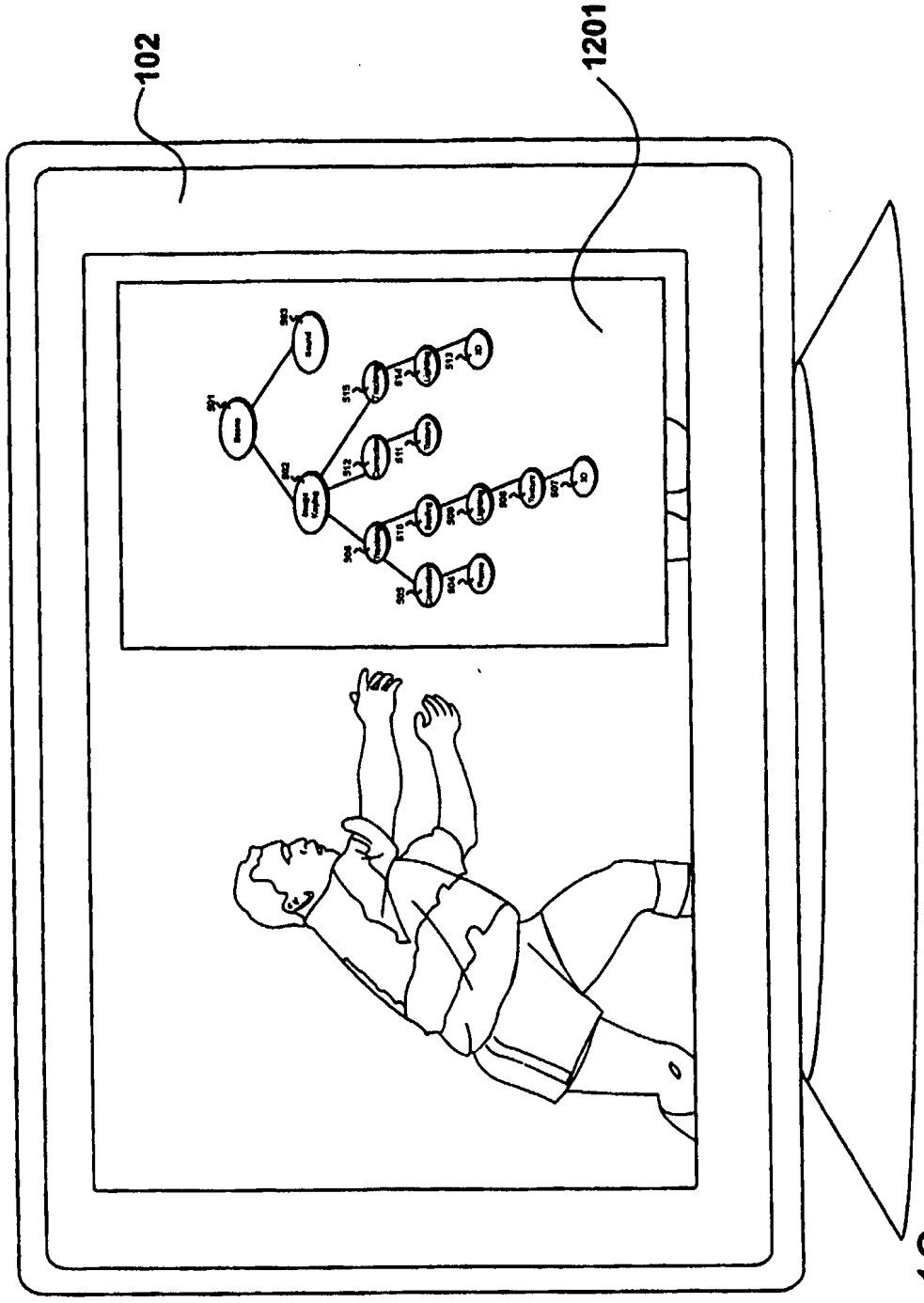


Figure 12

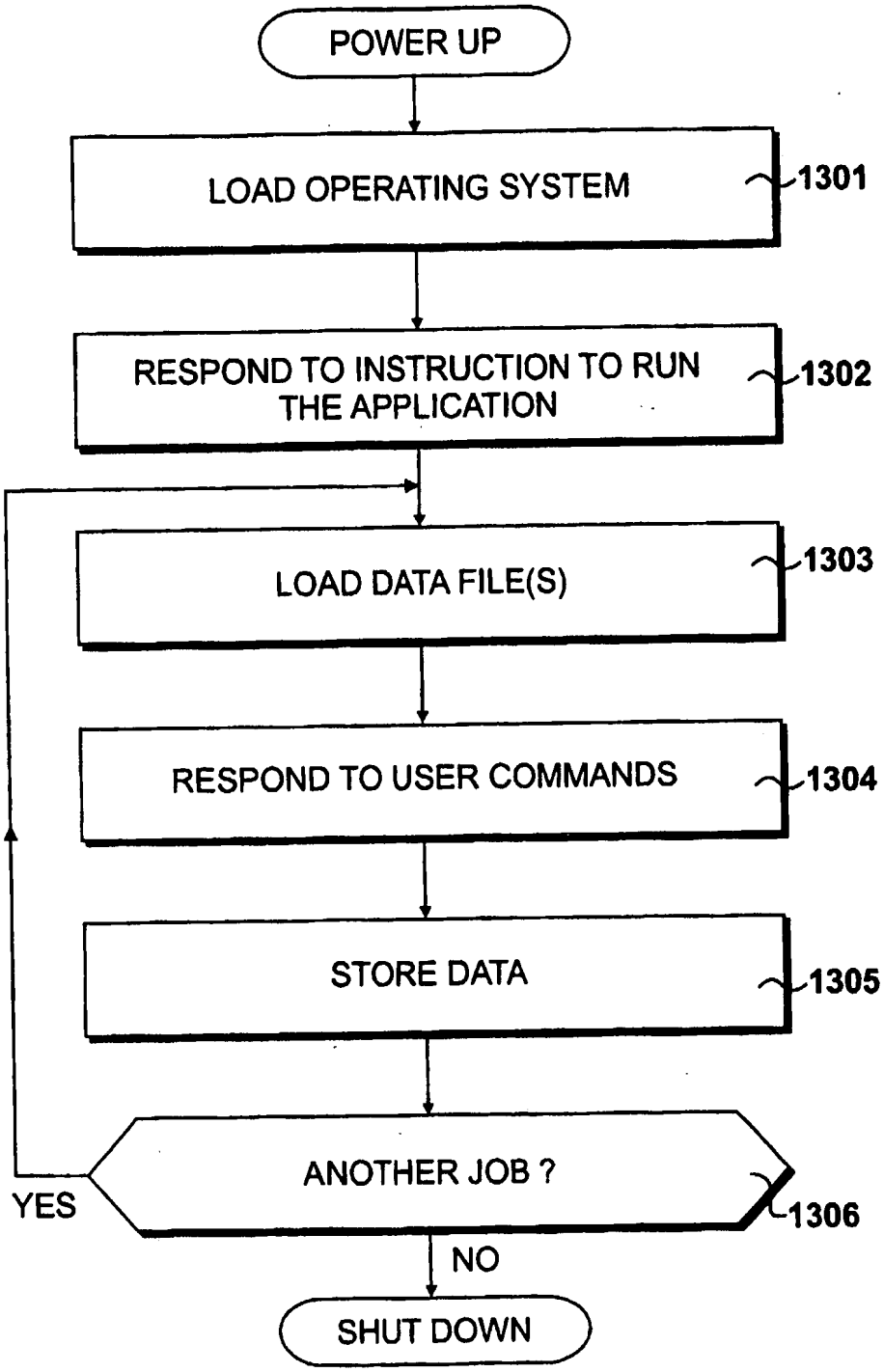

POWER UP
LOAD OPERATING SYSTEM
1301
RESPOND TO INSTRUCTION TO RUN THE APPLICATION
1302
LOAD DATA FILE(S)
1303
RESPOND TO USER COMMANDS
1304
STORE DATA
1305
ANOTHER JOB ?
1306
YES
NO
SHUT DOWN

Figure 13

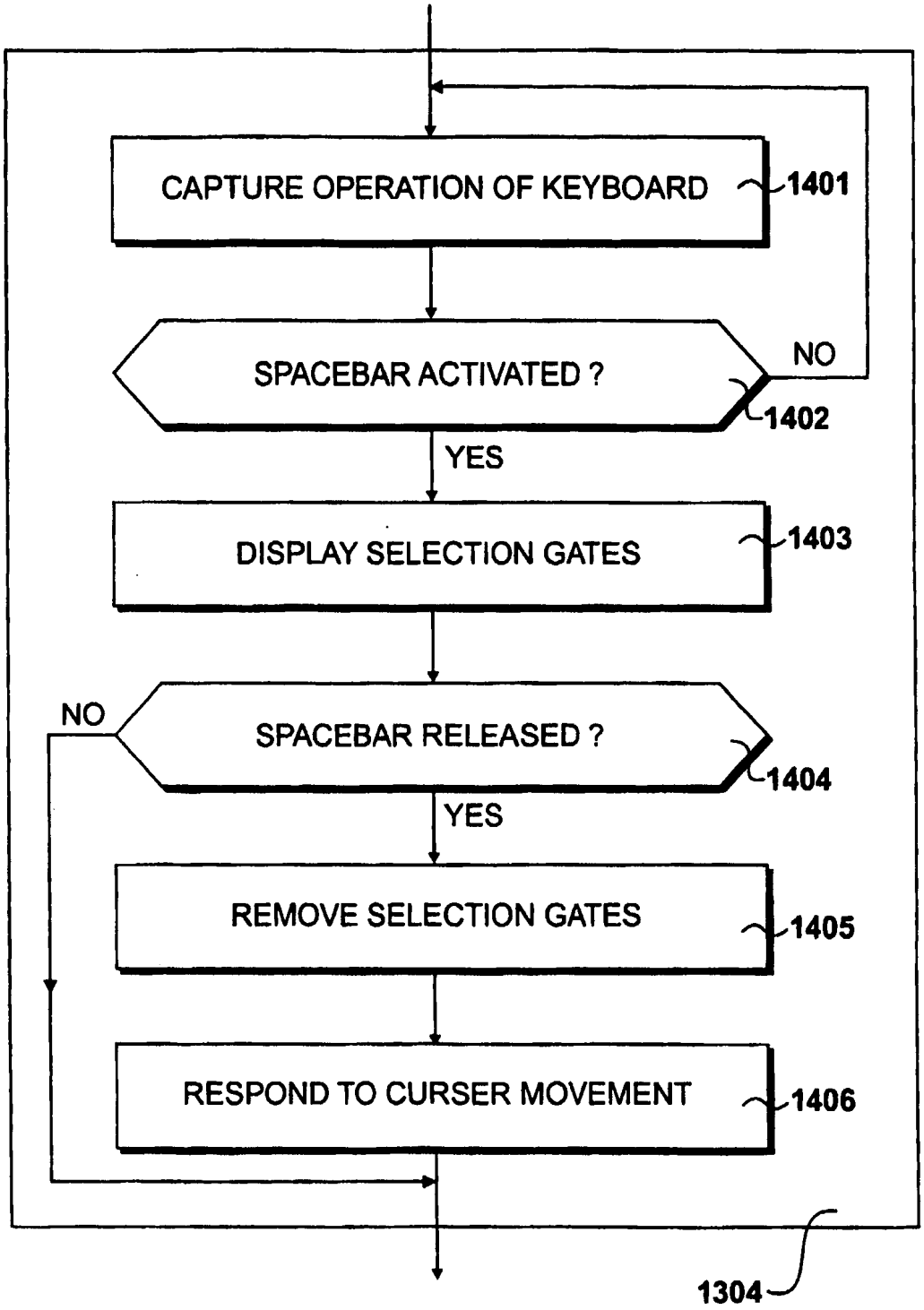

CAPTURE OPERATION OF KEYBOARD
1401
SPACEBAR ACTIVATED ?
NO
1402
YES
DISPLAY SELECTION GATES
1403
NO
SPACEBAR RELEASED ?
1404
YES
REMOVE SELECTION GATES
1405
RESPOND TO CURSER MOVEMENT
1406
1304

Figure 14

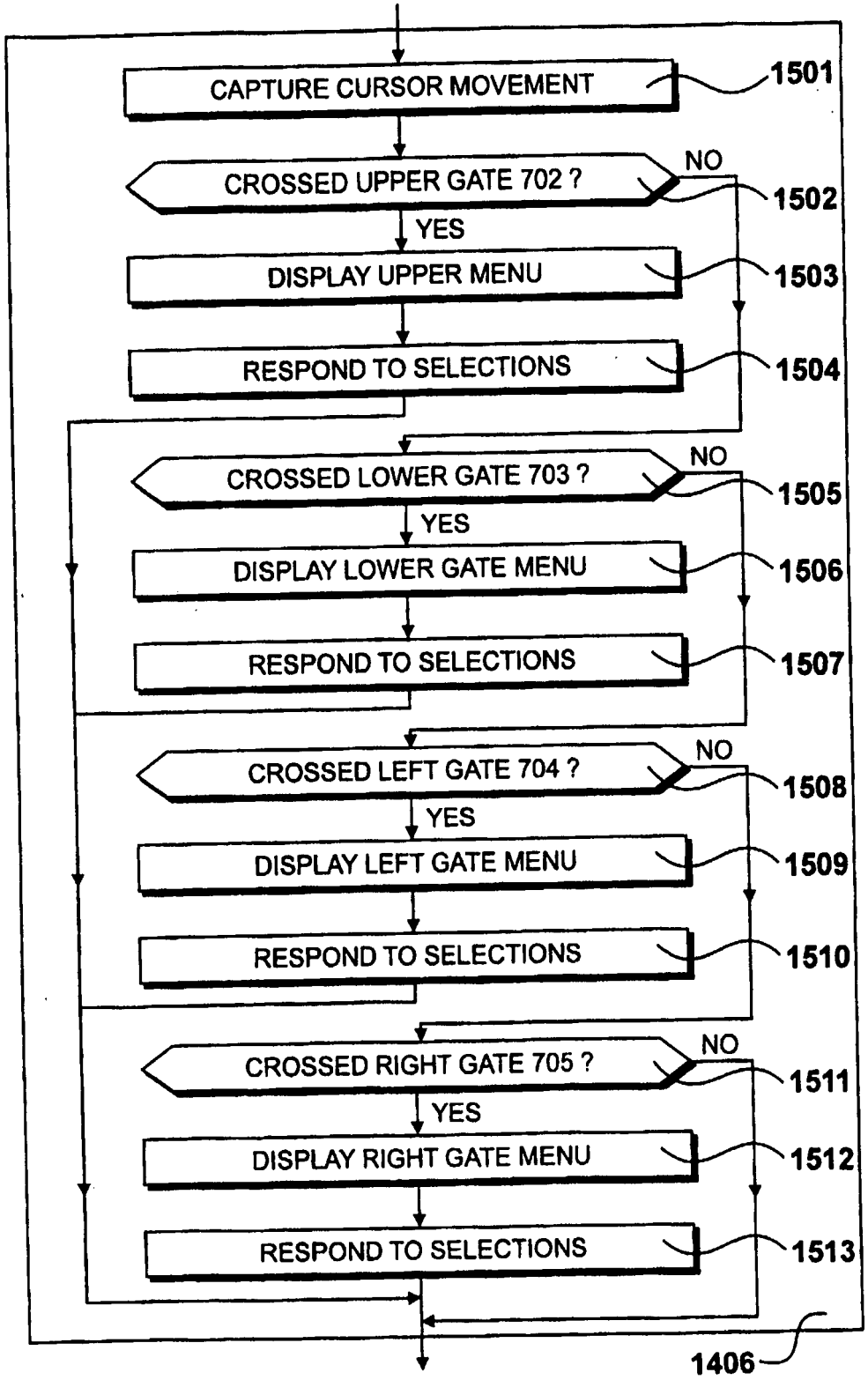

CAPTURE CURSOR MOVEMENT
1501
CROSSED UPPER GATE 702 ?
NO
1502
YES
DISPLAY UPPER MENU
1503
RESPOND TO SELECTIONS
1504
CROSSED LOWER GATE 703 ?
NO
1505
YES
DISPLAY LOWER GATE MENU
1506
RESPOND TO SELECTIONS
1507
CROSSED LEFT GATE 704 ?
NO
1508
YES
DISPLAY LEFT GATE MENU
1509
RESPOND TO SELECTIONS
1510
CROSSED RIGHT GATE 705 ?
NO
1511
YES
DISPLAY RIGHT GATE MENU
1512
RESPOND TO SELECTIONS
1513
1406

Figure 15

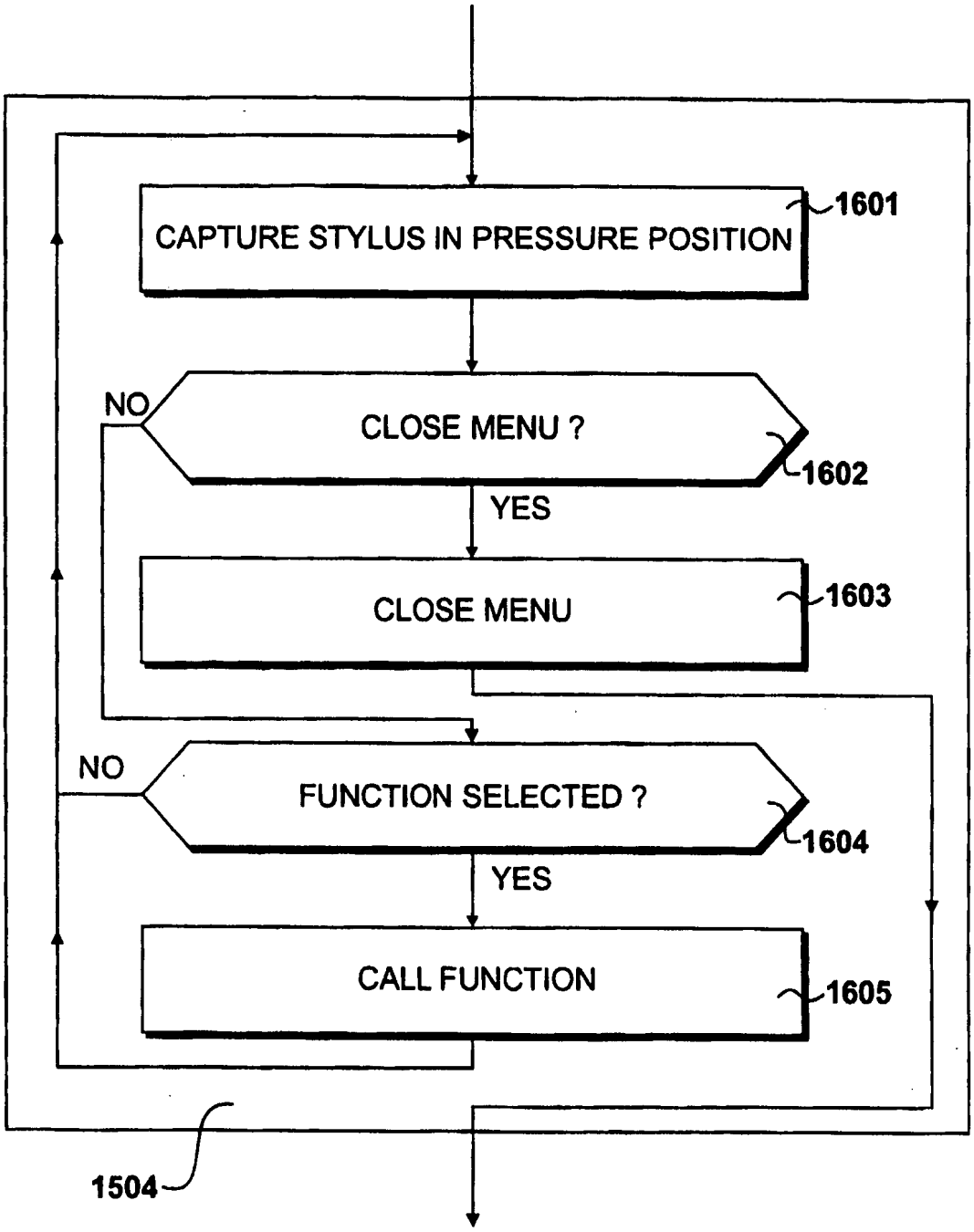

CAPTURE STYLUS IN PRESSURE POSITION
1601
NO
CLOSE MENU ?
1602
YES
CLOSE MENU
1603
NO
FUNCTION SELECTED ?
1604
YES
CALL FUNCTION
1605
1504

Figure 16

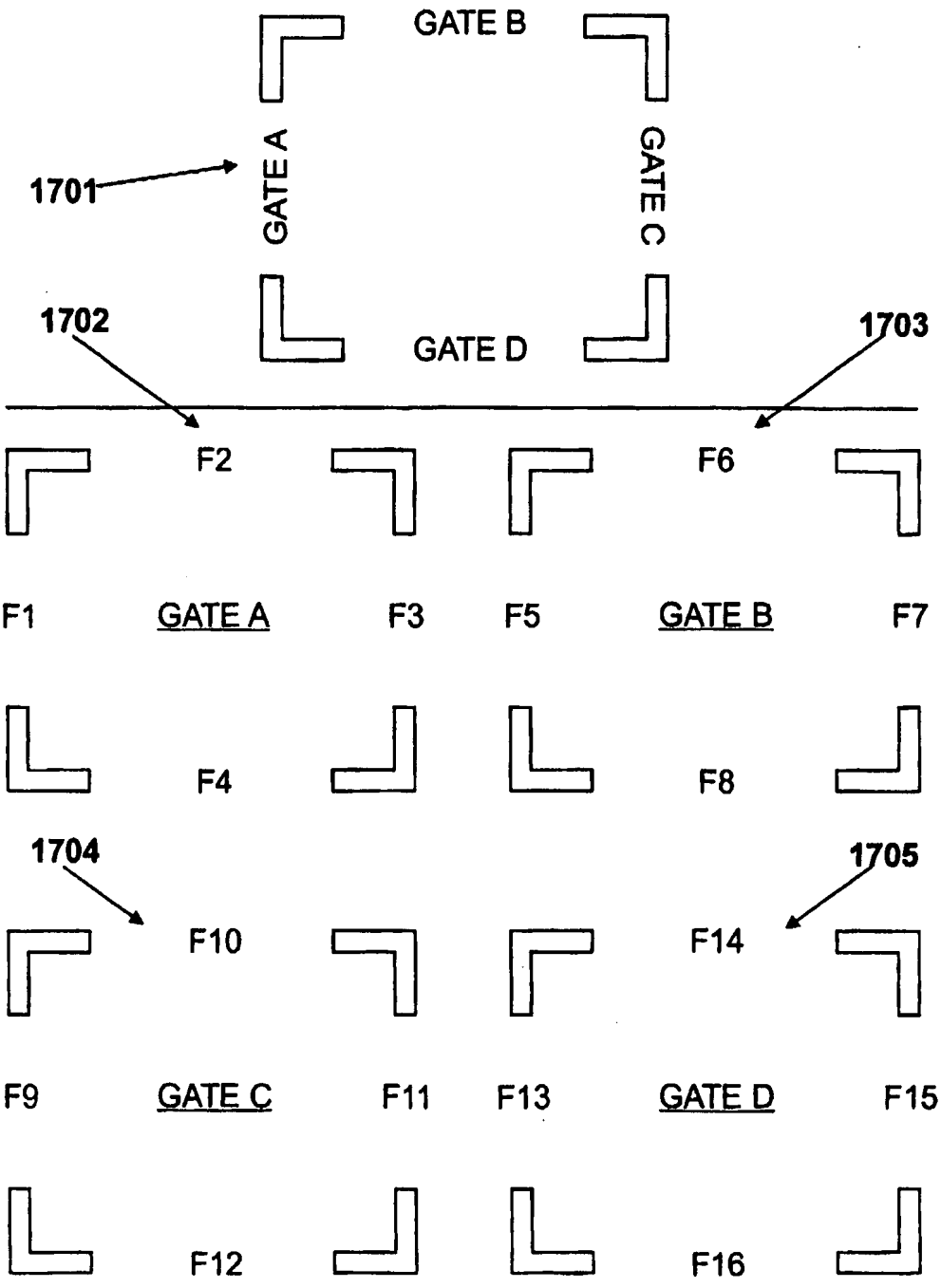

GATE B
GATE A
GATE C
1701
1702
1703
GATE D
F2
F6
F1
GATE A
F3
F5
GATE B
F7
F4
F8
1704
1705
F10
F14
F9
GATE C
F11
F13
GATE D
F15
F12
F16

Figure 17

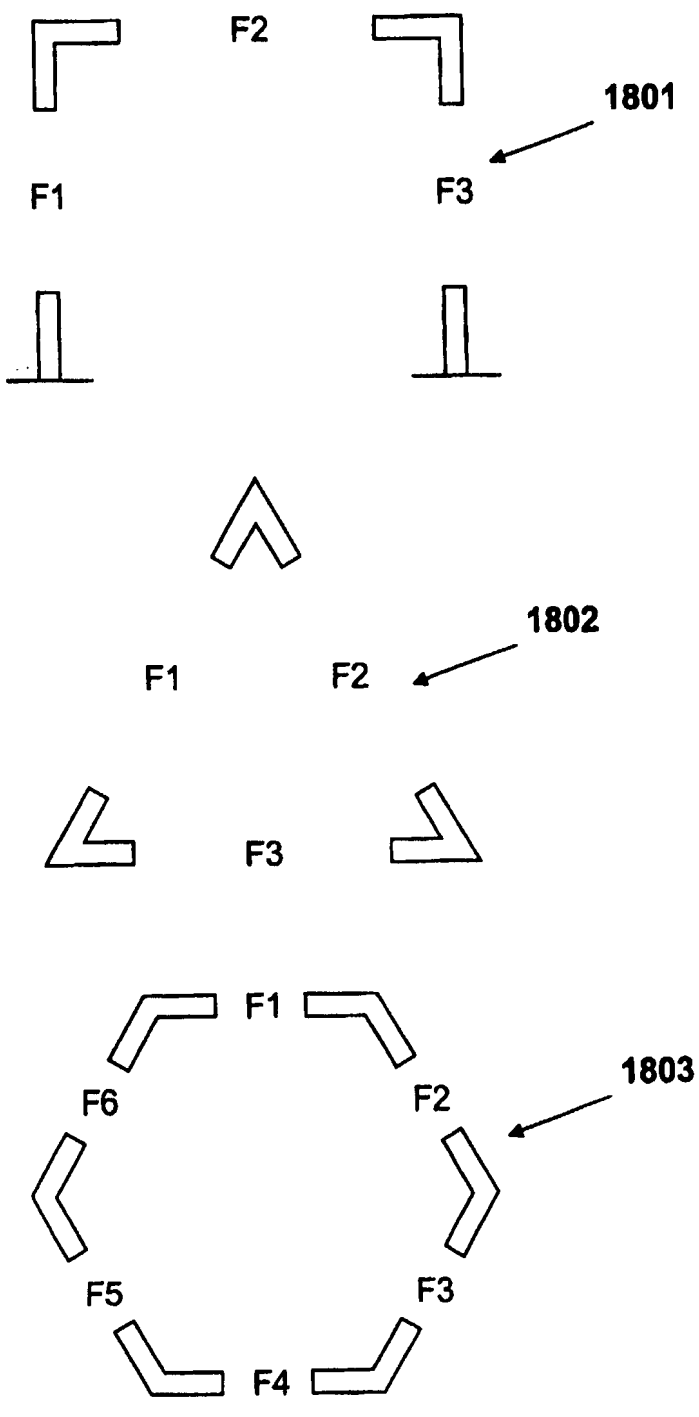


Figure 18

Selecting Functions Via a Graphical User Interface

Background of the Invention

1. Field of the Invention

The present invention relates to apparatus for processing image data and a method of selecting a function via a graphical user interface.

2. Description of the Related Art

Systems for processing image data, having a processing unit, storage devices, a display device and a stylus-like manually operable input device (such as a stylus and touchtablet combination) are shown in United States Patents 5,892,506; 5,786,824 and 6,269,180 all assigned to the present Assignee. In these aforesaid systems, it is possible to perform many functions upon stored image data in response to an operator manually selecting a function from a function menu.

Recently, in such systems as "FIRE" and "INFERNO", licensed by the present Assignee, the number of functions that may be performed have increased significantly. Thus, for example, there has been a tendency towards providing functions for special effects, compositing and editing on the same platform.

Function selection is often done via graphical user interfaces in which menus are displayed from which a selection may be made. A function selection using a menu is achieved by moving a cursor over to a selection position within the menu by operation of the stylus. The particular

function concerned is selected by placing the stylus into pressure; an operation logically similar to a mouse click. Menus of this type are used in systems where stylus-like input devices are preferred, in preference to pulldown menus, given that, with pulldown menus, it is necessary to maintain stylus pressure while menu selection takes place. Such an operation places unnecessary strain on the wrists and fingers of an operator and is therefore not preferred in applications that make significant use of stylus-like devices.

In addition to there being a trend towards increasing the level of functionality provided by digital image processing systems, there has also been a trend towards manipulating images of higher definition. Initially, many systems of this type were designed to manipulate standard broadcast television images such as NTSC or PAL. With images of this type, it is possible to display individual frames on a high definition monitor such that the displayed images take up a relatively small area of the monitor thereby leaving other areas of the monitor for displaying menus etc. Increasingly, digital techniques are being used on high definition video images or images scanned from cinematographic film. Such images have a significantly higher pixel definition. Consequently, even when relatively large monitors are used, there may be very little additional area for the display of menus.

Furthermore, operators and artists are under increasing pressure to increase the rate at which work is finished. Being able to work with systems of this type quickly and efficiently is not facilitated if complex menu structures are provided or manipulation tools are provided that are not

intuitive to the way artists work.

Brief Summary of the Invention

According to a first aspect of the present invention, there is provided apparatus for processing image data, comprising processing means, storage means, display means and stylus-like manually operable input means, wherein said processing means is configured to perform functions upon image data in response to an operator manually selecting a function from a function menu; said processing means responds to a first user-generated input command so as to display a plurality of function gates at a cursor position; movement of the stylus-like manually operable input means so as to move said cursor through one of said function gates results in a related menu being displayed; and manual selection of a function from said displayed menu results in the selected function being performed upon said image data.

Brief Description of the Several Views of the Drawings

Figure 1 shows a system for processing image data that embodies the present invention;

Figure 2 shows details the computer system shown in *Figure 1*;

Figure 3 shows illustrates the display of the prior art;

Figure 4 shows the display of *Figure 3* with graphically displayed menus as is known in the prior art;

Figure 5 shows an example of a scene graph defining how a

complex scene is rendered;

Figure 6 is the monitor of *Figure 1* displaying a high definition image;

Figure 7 shows a portion of the image shown in *Figure 6* with user interface gates embodying the present invention;

Figure 8 shows an abstracted view of the gates shown in *Figure 7*;

Figure 9 shows the high definition image of *Figure 6* with an overlaid upper menu;

Figure 10 shows the high definition image of *Figure 6* with a lower menu;

Figure 11 shows the high definition of *Figure 6* with a menu to the left;

Figure 12 shows the high definition image of *Figure 6* with a menu to the right;

Figure 13 identifies operations performed by the processing unit shown in *Figure 2*;

Figure 14 details procedures identified in *Figure 13*;

Figure 15 details procedures identified in *Figure 14*;

Figure 16 details procedures identified in *Figure 15*;

Figure 17 identifies a first alternative embodiment of the present invention;

Figure 18 identifies further alternative embodiments of the present invention.

Written Description of the Best Mode for Carrying Out the Invention

Figure 1

Preferred apparatus for processing image data and embodying the present invention is illustrated in *Figure 1*. A computer system **101** supplies output signals to a visual display unit **102**. The visual display unit **102** displays images, menus and a cursor and movement of said cursor is controlled in response to manual operation of a stylus **103** upon a touch table **104**. In addition, input data is also supplied to the computer system **101** via a keyboard **105**. Keyboard **105** is of a standard alpha numeric layout and includes a spacebar **106**. Manual operation of the spacebar **106** provides a first input command in a preferred embodiment resulting in a quadrilateral device being displayed at the cursor position. The quadrilateral device identifies a function type at each of its four edges, each having an associated displayable menu. In response to a second input command, preferably received from the stylus **103**, the cursor is moved over one of the edges of the displayed quadrilateral device. Thereafter, having moved the cursor over an edge of the quadrilateral device, the aforesaid menu associated with the edge over which the cursor has been moved is displayed. In this way, a user is given rapid access to a menu of interest without said menu being continually displayed over the working area of the VDU **102**.

Figure 2

Computer system **101** is illustrated in *Figure 2*. System bus **201** provides communication between a central processing unit **202**, random access storage devices **203**, a video card **204**, disk storage **205**, CD ROM reader **206**, a network card **207**, a tablet interface card **208** and a keyboard interface card **209**. Typically, the central processing unit may be an Intel based processor operating under the Windows operating system. Program instructions for the central processing unit **202** are read from the random access memory device at **203**. Program instructions embodying the present invention are preferably received via a CD ROM **210** for installation within the storage system of disk drive **205** via the CD ROM reader **206**.

Network card **204** supplies output signals to monitor **102** with input signals from the tablet **104** being received via a tablet interface **208** and input signals from keyboard **105** being received via the keyboard interface **209**. Network interface **207** allows the system to exchange files with a server or other networked stations.

Figure 3

A monitor **301**, similar of a prior art system and not that shown in *Figure 1* is illustrated in *Figure 3*. The monitor is displaying a video image **302** consisting of a plurality of frames played over a period of time at standard broadcast definition. The monitor has a substantially higher definition, thereby ensuring that there is plenty of space around the image **302** for graphical interfaces to be displayed.

Figure 4

Monitor **301** is shown in *Figure 4* with a plurality of menus, such as menu **304** and menu **305**, displayed around video image **302**. In this way, many control functions may be selected by appropriate operation of the stylus **103** upon a touch-tablet **104**. A function of interest is selected by placing the cursor over a soft button. The button is then depressed by placing the stylus **103** into pressure. This may result in a function being performed upon the image directly or, alternatively, may result in an appropriate sub-menu being displayed so that appropriate control may be made in response to user input.

Figure 5

It can be appreciated that the working space displayed on monitor **301** has become somewhat complex if all available functions are to be displayed.

The number of possible functions available to an artist has increased but increasingly more and more of these functions are used concurrently to produce a particular effect. Furthermore, it is preferable for the nature of the functions to be stored as definitions or metadata whereafter their implementation takes place in real-time. Thus, the process of compositing etc requires many functions to be performed as part of a final rendering operation rather than partially processed work being stored and then processed upon again. Consequently, many functions may be required and in order to make modifications an artist is required to identify a particular

function of interest.

In order to provide artists with a representation of the nature of a function being performed, the structure of the processing operations may be displayed as a process tree, as illustrated in *Figure 5*. The process trees generally consist of sequentially linked processing nodes, each of which specifies a particular processing task required in order to eventually achieve an output in the form of a composited frame or video sequence. Traditionally, an output sequence **501** will comprise both image data and audio data. Accordingly, the composited scene will require the output from an image keying node **502** and the output from a sound mixing node **503**. In this example, the image keying node **502** calls on a plurality of further processing nodes to obtain all the input data it requires to generate the desired image data, or sequence of composited frames. In the example, the desired output image data includes a plurality of frames within which a three-dimensional computer generated object is composited, as well as a background also consisting of a plurality of three-dimensional objects superimposed over a background texture.

The image keying node **502** initially requires a sequence of frames **504**, each frame of which is substantially processed by a colour correcting processing node **505** and a motion tracking processing node **506** such that the composited three-dimensional object generated by three-dimensional modelling node **507**, to which is applied a texture by the texturing node **508** and appropriate lighting by artificial light processing node **509** and finally appropriate scaling by scaling node **510** is seamlessly composited within

the colour correcting sequence of frames **104**. For the background, the image keying processing node **502** also requires a uniform texture from a texturing node **511**, the functionality of which is similar to texturing node **508**, to which is applied the colour correction functionality of a colour correction processing node **512**, the functionality of which is similar to the colour correcting processing node **505**. The image keying processing node **502** is finally required to overlay the plurality of simple three-dimensional objects generated from the three-dimensional modelling node **513**, which are appropriately lit by the artificial light processing node **514** and motion tracked by motion tracking processing node **515** over the colour corrected texture **511** before overlaying a compositive frame sequence of node **504** on top of the composited background.

Each node illustrated in *Figure 5* will have an associated menu of controls allowing modifications to be made at that particular point in the overall image processing exercise. Thus, when modifications are made at the menu level, it is necessary for a database to be established so as to oversee the relationship between manual input commands being made and their associated node at which the modifications are take effect. Thus, the complexity of images results in a greater requirement for the display of control menus so as to allow full control to be given to an artist during a compositing exercise.

Figure 6

Problems associated with the availability with monitor space are

made worse when the definition of images being processed is increased. *Figure 3* shows a prior art example of a standard television broadcast image being processed. However, as illustrated in *Figure 6*, the present invention is particularly directed towards the processing of higher definition images such as images derived from cinematographic film. Thus, a high definition image has been loaded of a definition such that, when displayed, as illustrated in *Figure 6*, the whole of the available display space of visual display unit **102** is used for displaying the image frames. Even with very large visual display units, it is recognised that artists must work with material at an appropriate definition so as to ensure that the introduction of visible artefacts is minimised. However, a problem with displaying images at this definition as illustrated in *Figure 6*, is that the monitor does not provide additional space with a display of menus alongside the displayed high definition images.

Region **602** of the high definition image **601** is shown enlarged in *Figure 7*. A cursor **603** is shown in *Figure 6* at a selected position. After being placed in this selected position, an artist operates spacebar **106** of the keyboard **105** resulting in a quadrilateral device being displayed at the cursor position.

Figure 7

A quadrilateral graphical user interface device providing four regions that have been identified as "gates" is shown at **701** in *Figure 7*. Each gate of the quadrilateral device identifies a function type and each of said

function types has an associated displayable menu. For activating the spacebar, the quadrilateral device **701** is located around the position of the displayed cursor **602**. The quadrilateral device **701** remains displayed while the spacebar **106** is held down by the artist. The device **701** may be removed simply by removing pressure from the spacebar **106**. Moving the stylus **103** in an upwards direction results in the displayed cursor **602** passing through the "viewer" gate **702**. In response to passing the cursor through the viewer gate **702**, a viewer menu is displayed in an upper portion of the screen. Similarly, by moving the stylus **103** in a downward direction, the cursor **602** is passed through tool control gate **703**, identified as the object tool in *Figure 7*. By moving the stylus **103** to the left, the cursor **602** passes through a "layer" gate **704** resulting in an associated menu being displayed to the left of the image. Furthermore, by moving the stylus **103** to the right, the displayed cursor **602** is taken through the tools gate **705**, resulting in an appropriate menu being displayed to the right of the image.

The particular function types available are relevant to the application being performed in the preferred embodiment. However, it should be appreciated that similar techniques may be used in different environments.

Figure 8

An abstracted interface is illustrated in *Figure 8*. In response to a first input command, a quadrilateral device **801** is displayed at a cursor position. In the preferred embodiment, this first input command consists of the

spacebar of a keyboard being depressed. The quadrilateral device identifies a function type at each of its four edges and by passing the cursor **802** through one of these function types, an appropriate menu is displayed, preferably at a location related to the gate through which the cursor has been passed. Thus, if the cursor **802** moves to the left, preferably a left menu is displayed; if the cursor **802** moves to the right, preferably a right menu is displayed; if the cursor **802** moves upwards, preferably an upper menu is displayed; and if the cursor **802** moves downwards, preferably a lower menu is displayed.

Figure 9

Movement of cursor **602** in response to stylus **103** in an upwards direction through gate **702** results in a viewer gate menu **901** being displayed in an upper portion of the screen. The viewer gate menu is used to set viewer specific options such as render pre-sets for three-dimensional players or filtering for schematics. The viewer menu relates directly to the viewer in focus and the name of the viewer in focus preferably appears in the gate user interface. The displayed menu takes up the same width as a tool panel user interface and it is locked to the top of the user interface regardless of how many viewers are present. The panel is fully opaque and sits over all other panels. Upon leaving the viewer gate menu the menu itself disappears thereby returning the full screen to the image under consideration.

Figure 10

Moving the cursor **602** in a downward direction, through gate **703**, results in a current tool menu **901** being displayed in a lower region of the screen of monitor **102**. The current tool menu is used to interact with the current tool. Gate **703** is only available if one tool has been selected. Thus, the gate relates directly to the current tool under consideration. The name of the current tool preferably appears in the gate user interface. The menu is locked to the bottom of the player in focus and use is also made of the transport tool user interface.

After use has been made of the current tool menu, the menu is removed by activating spacebar **106** again, thereby making the whole screen available for the whole image.

Figure 11

Upon moving cursor **602** in a leftward direction through gate **704**, a layer gate menu **1101** is displayed. The layer menu is used to select layers and the layer user interface takes up the same width as a layer list. It is locked to the left side of the user interface regardless of how many viewers are present. The panel is fully opaque and sits over all other panels. The layer gate menu **1101** only contains details of the layers; the layer list is not expandable and there is no value column. A user can set whether a layer is visible or not visible and the layer menu **1101** disappears after the cursor exits to a new area.

Figure 12

Upon moving cursor **602** in a rightwards direction through gate **705** tools menu **1201** is displayed. The tools menu is used to select the current tool and is only available when only one layer has been selected. The tools gate menu takes up the same width as the layer list and is locked to the right side of the interface regardless of how many viewers are present. The panel is fully opaque and sits over all other panels. The tools menu **1201** contains a filtered version of the schematic showing only the tools associated with a selected object. The menu disappears after the cursor has been moved out of the menu area.

Figure 13

Operations performed by the processing unit **202** in order to provide the functionality described with reference to *Figures 6* to *12*, is identified in *Figure 13*. After power-up an operating system is loaded at step **1301** whereafter at step **1302** the system responds to instructions from a user to run the compositing application.

At step **1303** data files are loaded and at step **1304** the application operates in response to commands received from a user. At step **1305** newly created data is stored and at step **1306** a question is asked as to whether another job is to be processed. When answered in the affirmative, control is returned to step **1303** allowing new data files to be loaded. Alternatively, if the question asked at step **1306** is answered in the negative, the system is shutdown.

Figure 14

Procedures **1304** relevant to the present preferred embodiment are illustrated in *Figure 14.* At step **1401** a keyboard operation is captured and at step **1402** a question is asked as to whether the spacebar has been activated. If answered in the negative, control is returned to step **1401** else control is directed to step **1403**.

In response to the spacebar being activated and detected at step **1402**, selection gates **701** are displayed at step **1403**. At step **1404** a question is asked as to whether the spacebar has been released and if answered in the affirmative, the selection gates are removed. Alternatively, if the question asked at step **1401** is answered in the negative, control is directed to step **1406** such that the application responds to further cursor movement.

Figure 15

Procedure **1406** is detailed in *Figure 15.* At step **1501** cursor movement is captured and at step **1502** a question is asked as to whether the cursor has moved across the upper gate **702**. If answered in the negative, control is directed to step **1505**, but if answered in the affirmative the upper menu (the viewer menu in the preferred embodiment) is displayed at step **1503** and the system responds to menu selections made at step **1504**.

At step **1504** a question is asked as to whether the cursor has

crossed the lower gate **703** and if answered in the negative control is directed to step **1508**. If answered in the affirmative, to the effect that the cursor did cross the lower gate **703**, the lower gate menu (selected tool menu in the preferred embodiment) is displayed at step **1506** and responses to selections are made at step **1507**.

At step **1508** a question is asked as to whether the cursor has crossed the left gate **704** and if answered in the negative control is directed to step **705**. In answered in the affirmative, the left gate menu (the layer menu in the preferred embodiment) is displayed at step **1509** and responses to selections are made at step **1510**.

At step **1511** a question is asked as to whether a cursor has crossed the right gate **705**. If answered in the affirmative, the right gate menu (the tools menu in the preferred embodiment) is displayed at step **1512** and the system responds to manual selections at step **1513**.

Figure 16

Procedures **1504** for responding to input selections are detailed in *Figure 16*. At step **1601** a position is captured when the stylus **103** is placed in pressure.

At step **1602** a question is asked as to whether a menu has been closed, either as a result of a "close menu" button being operated or, for certain menus, whether the stylus has been taken outside the menu area. If answered in the affirmative, the menu is closed at step **1603**.

If the question asked at step **1602** is answered in the negative, a

question is asked at step **1604** as to whether a function has been selected. If answered in the affirmative, the function is called at step **1605**.

Procedures **1507**, **1510** and **1513** are substantially similar to procedures **1504** shown in *Figure 16*.

Figure 17

An alternative embodiment is illustrated in *Figure 17*. In this embodiment, displayed quadrilateral devices representing gates are nested. On operation of the spacebar **106**, a first device **1701** is displayed. Subsequent movement of the cursor to the left results in a further gate "Gate A" being selected as illustrated at **1702**. Similarly, movement in an upwards direction results in a second gate "Gate B" being selected as illustrated at **1073**. Similarly, movement to the right results in a further gate "Gate C" being selected as illustrated at **1704**. Finally, movement in a downwards direction results in a further gate "Gate D" being selected as illustrated at **1705**.

Thus, movement of the cursor through any of the four gates shown in device **1701** results in a further gate being displayed, either Gate A, Gate B, Gate C or Gate D depending upon the direction of movement. Similarly movement then allows specific functions to be selected or, in an alternative embodiment, further nestings may be selected. Thus, in this example, upon producing Gate A, it is then possible to select functions F1, F2, F3 or F4. Similarly the presentation of Gate B allows further functions F5, F6, F7 or F8 to be selected. Similarly, the presentation of Gate C allows functions F9,

F10, F11 or F12 to be selected. Finally, the presentation of Gate D allows functions F13, F14, F15 or F16 to be selected.

In a preferred embodiment, the displayed device is a quadrilateral and thereby allows four selections to be made. In example **1801** shown in *Figure 18*, only one of three possible selections needs to be made. Thus, it is possible to move a cursor to the left to select function F1, to move the cursor upwards to select function F2 or to move the cursor to the right to select function F3. No response is obtained if the cursor is moved in a downwards direction.

An alternative approach to representing these three functions F1, F2 and F3 is illustrated at **1802**. Here, as an alternative to being placed in a quadrilateral device, the device is substantially triangular. Similarly at **1803** six selections may be made, functions F1, F2, F3, F4, F5 or F6 by means of a substantially hexagonal device.

Claims:

1. Apparatus for processing image data, comprising processing means, storage means, display means and stylus-like manually operable input means, wherein

said processing means is configured to perform functions upon image data in response to an operator manually selecting a function from a function menu;

said processing means responds to a first user-generated input command so as to display a plurality of function gates at a cursor position;

movement of the stylus-like manually operable input means so as to move said cursor through one of said function gates results in a related menu being displayed; and

manual selection of a function from said displayed menu results in the selected function being performed upon said image data.

2. Apparatus according to claim 1, wherein said manually operable input means is a stylus and a touch-tablet combination.

3. Apparatus according to claim 1, wherein a first user-generated input command is generated in response to keyboard operation.

4. Apparatus according claim 3, wherein said keyboard operation involves activation of a spacebar.

5. Apparatus according to claim 1, wherein four function gates define a substantially quadrilateral shape.

6. Apparatus according to claim 1, wherein said menus relate to functions applicable to image data processing.

7. Apparatus according to claim 6, wherein said image data processing functions relate to compositing and editing image frames.

8. A method of selecting a function via a graphical user interface for receiving input commands, wherein

in response to a first input command, a quadrilateral device is displayed at a cursor position;

said quadrilateral device identifies a function type at each of its four edges, each having an associated displayable menu;

In response to a second input command, a cursor is moved over one of said edges; and

having moved the cursor over an edge or the quadrilateral device the aforesaid menu associated with the edge over which the cursor has been moved is displayed.

9. A method of supplying input data to a computer system, comprising the steps of

issuing a first input command to call up a graphical user interface in which a plurality of gates surround a cursor position; and

in response to a second input command, moving said cursor through one of said gates.

10. A method according to claim **9**, wherein four gates are displayed in said graphical user interface in a configuration substantially quadrilateral.

11. A method according to claim **9**, wherein the passing through a gate of said graphical user interface results in a further lower level of gates being displayed.

12. A computer-readable medium having computer-readable instructions executable by a computer such that, when executing said instructions, said computer will perform the steps of:

responding to a first user-generated input command so as to display a plurality of function gates at a cursor position;

responding to movement of manually operable input means so as to move said cursor through one of said function gates and displaying a menu in response to said cursor movement; and

responding to manual selection of a function from said displayed menu so as to perform said function upon image data.

13. A computer-readable medium having computer-readable instructions according to claim **12**, wherein said cursor moves through one of said function gates in response to manual operation of a stylus upon a touch-tablet.

14. A computer-readable medium having computer-readable instructions according to claim **12**, such that when executing said instructions a computer will display four function gates that define a substantially quadrilateral shape.

15. A computer-readable medium having computer-readable instructions according to claim **12**, such that when executing said instructions a computer will display a menu at a screen position related to the relative positions of its respective gate.

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Application No: GB 0216824.3 **Examiner:** Iwan Thomas
Claims searched: 1-15 **Date of search:** 6 November 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X	1, 8, 9 & 12 at least	EP 0498082A1	(PHILIPS) See whole document
X	9	EP 0355458A2	(IBM) See whole document
X	9	JP 63229515A	(FUJITSU) See abstract and figures 1(b), 5-8 and 10

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The following online and other databases have been used in the preparation of this search report:

Online: WPI, EPODOC, PAJ